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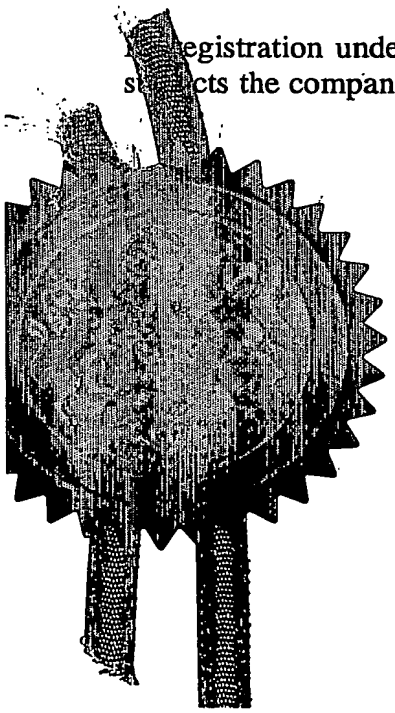

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Signed J Behen

Dated 24 March 2003

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Patents Act 1977
(Rule 16)

The Patent Office

12MAR02 E702505-1 D00350
P01/7700 0.00-0205667.9

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

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The Patent Office
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Newport
Gwent NP9 1RH

1. Your reference

RH/ALO/P/204TT.GB

2. 0205667.9

12 MAR 2002

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

Sinclair International Limited,
Jarrold Way,
Bowthorpe,
Norwich,
Norfolk, NR5 9JD.

Patents ADP number *(if you know it)*

660455 7001

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

Improvements in or relating to apparatus for the assessment of the condition of fruit and vegetables

5. Name of your agent *(if you have one)*

Wilson Gunn M'Caw

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

41-51 Royal Exchange,
Cross Street,
Manchester.
M2 7BD.

Patents ADP number *(if you know it)*

7153927001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day / month / year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

a) any applicant named in part 3 is not an inventor, or

b) there is an inventor who is not named as an applicant, or

c) any named applicant is a corporate body.

See note (d))

YES

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Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	
Description	05
Claim(s)	
Abstract	
Drawing(s)	02

10. If you are also filing any of the following, state how many against each item.

Priority documents	
Translations of priority documents	
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	
Request for preliminary examination and search *(Patents Form 9/77)*	
Request for substantive examination *(Patents Form 10/77)*	
Any other documents *(please specify)*	

11. I/We request the grant of a patent on the basis of this application.

Signature [signature] Date 12/03/02

12. Name and daytime telephone number of person to contact in the United Kingdom

Richard Hill
0161 827 9400

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IMPROVEMENTS IN OR RELATING TO APPARATUS FOR THE ASSESSMENT OF THE CONDITION OF FRUIT AND VEGETABLES

This invention relates to improvements in or relating to apparatus for the assessment of the condition of fruit and vegetables.

In our co-pending published PCT Application No. WO 98/52037 there is disclosed an assembly for measuring the condition of fruit and vegetables in which an expandable resilient bellows arrangement having a passive sensor mounted therein can be expanded so as to bring the sensor into contact with, or adjacent to, an item of fruit or vegetables whereby the sensor can react to a property of the fruit or vegetable and produce a signal related to that property. The bellows assembly can then be contracted away from the fruit or vegetable.

A problem with this arrangement is that for consistent measurement, it is necessary to ensure that the sensor moves towards the item of fruit or vegetable substantially perpendicularly. If the sensor moves at an angle to the fruit or vegetable then inaccurate results can be obtained.

It is an object of the present invention to provide an arrangement of the type disclosed in our earlier application in which it is possible to obtain a more consistent measurement over a relatively larger angular range of impact between the sensor and the surface of the fruit or vegetable being tested.

Thus and in accordance with the present invention therefore there is provided apparatus for measuring the condition of fruit and vegetables comprising plunger means formed by a resilient bellows assembly which is capable of expansion under the action of pressurised air and retraction by the application of a vacuum, said plunger means carrying a passive sensor which on expansion is brought into contact with an item of fruit or vegetable whereby the sensor reacts to a property of said fruit or vegetable to produce an output signal related to that property characterised in that at least a part of said sensor which contacts said item of fruit or vegetable is of curved shape.

With this arrangement, the curved shape of the sensor ensures a consistent accurate output signal related to the condition of the fruit or vegetable over a relatively wide range of angles of impact of the sensor to the surface of the fruit or vegetable.

The invention will now be described further by way of example only and with reference to the accompanying drawing, the single Figure of which shows one embodiment, not to scale, of an assembly in accordance with the present invention.

The assembly 10 is shown in the Figure, mounted within a bellows assembly 11 of the type described in US Patent No. 4,217,164 and is moveable with the bellows assembly towards and away from the fruit or vegetable 12 to be assessed.

The assembly 10 comprises a housing consisting of two interconnected parts 13, 14. Mounted within the housing is a moveable carriage 16 to which is fixed a lug 17. The carriage 16 is moveable within the housing against the bias of a biasing member 18, preferably in the form of a spring. The lug 17 has an internal bore 19 through which extends an electrical connection 21 into connection with a piezo electric sensor 22 of generally curved, preferably hemispherical, form mounted at one end of the lug 17. The lug 17 is connected to a damping member 23 which extends through aligned apertures 24, 26 in the carriage 16 and housing part 13 respectively. Conveniently, the electrical connection 21 will extend along side or within the damping member 23.

In use, as the bellows assembly 10 expands as pressurised air is introduced as mentioned in the aforementioned US Patent, the piezo electric sensor 22 is moved towards the surface of a fruit or vegetable 12 to be tested. As the bellows 10 moves towards the fruit or vegetable, the lug 17 moves against the bias of the biasing means 18. As the bellows 10 reaches full expansion, the momentum of the lug 17 causes the lug 17 to continue to move against the bias of the biasing means 18 bringing the piezo electric sensor 22 into contact with a surface of the fruit or vegetable 12 being tested. It will be appreciated that by positioning the assembly of the invention an appropriate distance from the fruit or vegetables to be tested it is possible for the movement of the sensor 22 after the bellows assembly 10 has reached full expansion to

provide a tapping type of motion onto the surface of the fruit or vegetable 12 being tested. It will be appreciated that such tapping motion will not affect the condition of the fruit or vegetable being tested.

Because the piezo electric sensor 22 has a curved surface, it is not necessary for the sensor 22 to contact with the surface of the fruit or vegetable being tested precisely perpendicularly to achieve accurate results using the assembly of the invention. The curvature of the sensor 22 means that good measurements can be achieved over a range of angles of contact determined by the angle of curvature surface of the sensor 22. This means that it is not necessary for either the fruit being tested or the sensor assembly to be precisely accurately aligned for the system to produce accurate results.

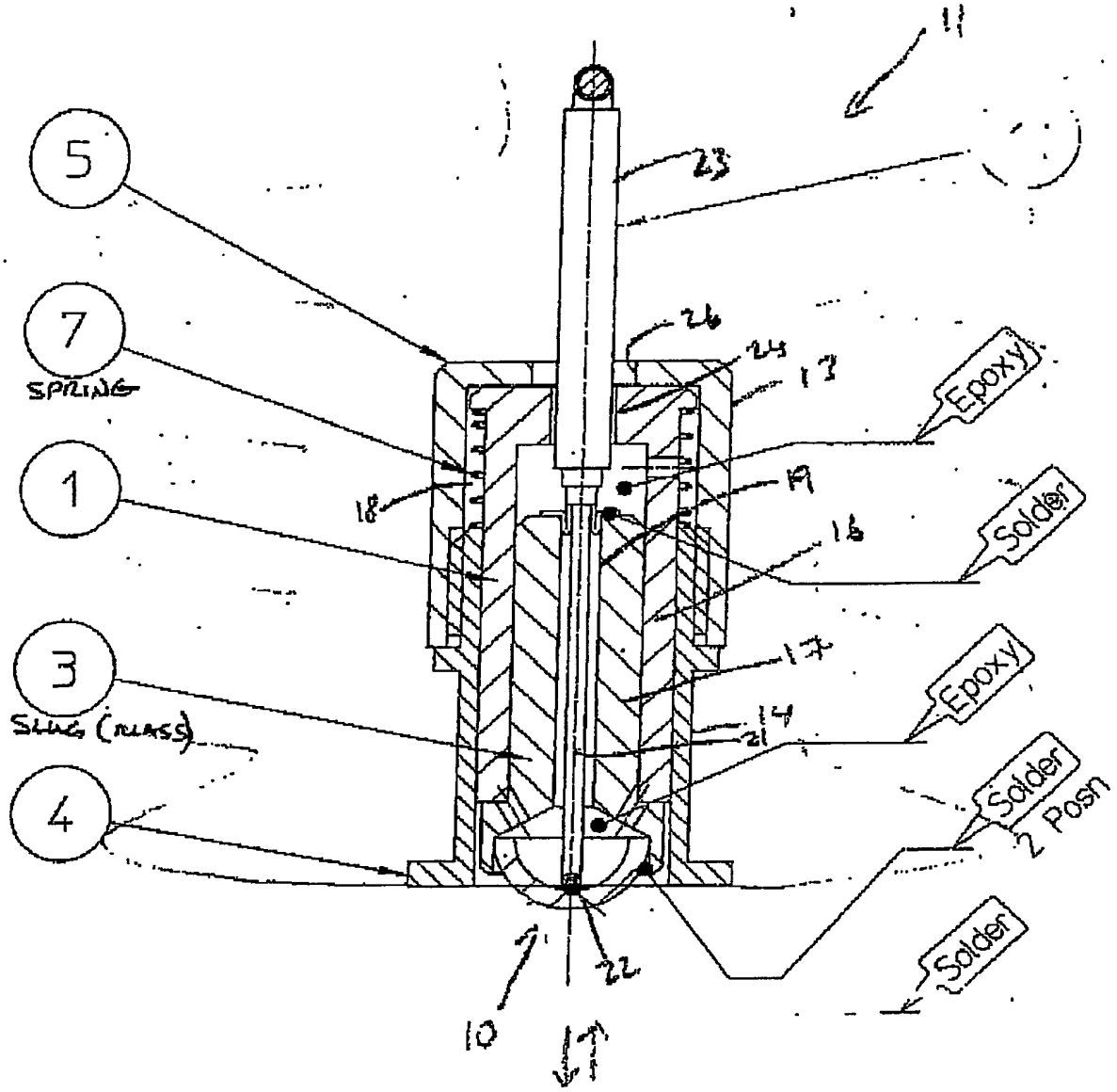
The piezo electric sensor 22 generates a signal which is indicative of the condition of the fruit or vegetable. The signal from the piezo electric sensor 22 is passed via the electrical connection 21 to suitable processing circuitry and possibly a display (not shown).

The bellows are then retracted by introduction of a vacuum into the bellows assembly 10 thereby moving the sensor 22 away from the fruit or vegetable. During this movement, once again movement of the lug 17 within the housing is biased by the biasing means 18.

It will be appreciated that the assembly of the invention makes it more simple to obtain consistent results without the need for absolute precision in setting up the assembly. It will be appreciated that it is

important that accurate testing can be undertaken to prevent fruit or vegetables being incorrectly identified as to their condition.

It is of course to be understood that the invention is not intended to be restricted to the details of the above embodiments which are described by way of example only



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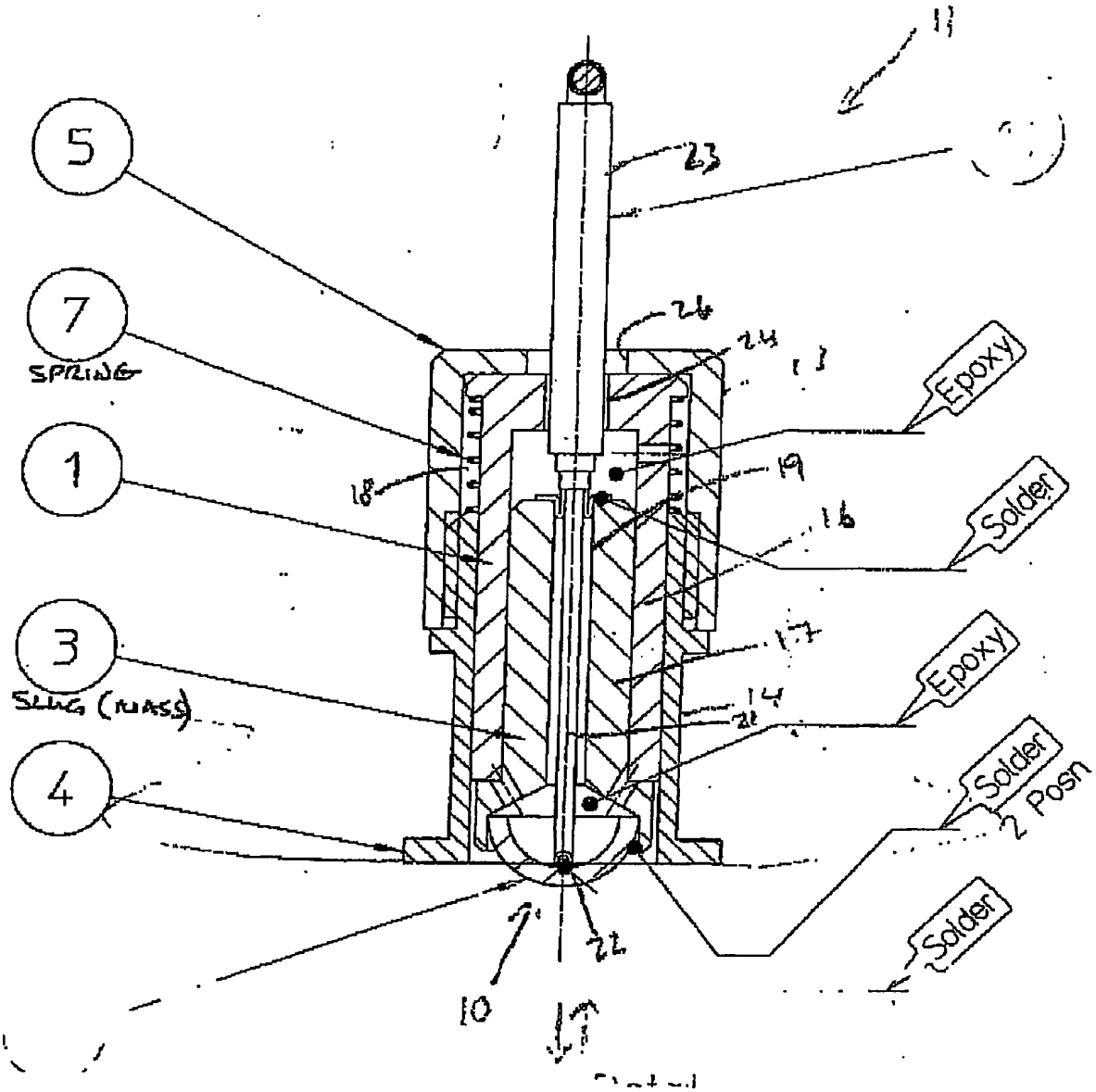
5
7
SPRING
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